

NOTES OF SEVEN CASES OF HYDROPHOBIA,

WITH REMARKS ON TREATMENT.

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MANCHESTER ROYAL INFIRMARY.

NOTES OF SEVEN CASES OF HYDROPHOBIA, WITH REMARKS ON TREATMENT.

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THE following particulars of seven cases of hydrophobia which were treated in the Manchester Royal Infirmary during my two years' tenure of office as resident surgical officer may, perhaps, not be considered unworthy of record; and although in each instance the result was fatal, yet I have been induced to publish them, in the hope that some of the facts observed may assist further investigators, by throwing some light on the treatment, hitherto so unsatisfactory, of this fearful disease. (*See Table on last page.*)

CASE I.—In this case, the symptoms were extremely well marked; the spasms at the time of admission were almost constant, and were excited by the approach of any person, or by the slightest draught of air; the patient exhibited no dread of liquids, asking to have her lips moistened with water, and voluntarily attempting to drink, but being obliged to desist on account of the severe spasms excited by the attempt. Seven hours after admission, she became wildly delirious, and so violent that she had to be fastened down in bed. The case was treated throughout by subcutaneous injections of chloral, in fifteen-grain doses, repeated at intervals of from one to three hours. This plan of treatment appeared, from the first, to give a marked but only temporary relief to the symptoms, each injection being followed by an abatement in the violence of the spasms. Twelve hours after admission, and after two drachms of chloral had been administered in the manner described, they had almost entirely disappeared; and, six hours later, she was sitting up quietly in bed, perfectly sensible, drinking tea, and taking solid food, without the slightest difficulty. Three hours later, there was a sudden return of the convulsions, attended by severe vomiting and copious discharge of saliva; after this, she fell into a condition of coma, and, the pulse becoming very rapid and almost imperceptible, death ensued about twenty-eight hours after admission.

The temperature, which at the time she came under treatment registered 100.2°, gradually sank to 97.6°, and then steadily rose again, registering, shortly before death, 103.2°.

CASE II.—In this case, the symptoms were very similar to the preceding, but the spasms were excited by the sight or even mention of fluids, and also by the sound of pouring water from one vessel to another. There was complete inability to swallow, though the patient suffered from intense thirst. An attempt to give chloroform, with the

view of introducing some food into the stomach, by means of the stomach-pump while under its influence, excited such severe spasm that its administration had to be discontinued. The case was treated with chloral (450 grains being given by subcutaneous injection in doses of from 15 to 40 grains, and 120 grains being administered by enema) and morphia (eight grains being given by injection). In this, as in the preceding case, there were temporary remissions in the symptoms, with exacerbations, accompanied by wild delirium, the spasms appearing to be relieved, and at times altogether disappearing under the influence of the chloral, but never to such an extent as to enable the patient to swallow. Towards the end, chloroform was again administered, and this time successfully, for the patient was completely brought under its influence; but, on discontinuing the anæsthetic, the symptoms returned unrelieved. Death took place from simple exhaustion, fifty-one hours after admission, the spasms having entirely ceased some time previously.

The temperature, which was 99.6° on admission, gradually rose to 105° before death.

CASE III.—The symptoms at first were of a very mild type, but sufficiently well marked to leave no doubt as to diagnosis. The patient was at times able to swallow with very little difficulty, the spasm excited by the attempt being very slight. With the exception of two injections of half a grain of morphia, no treatment was adopted. Fourteen hours after admission, severe spasms, however, set in very suddenly, the respiratory muscles being chiefly affected; this condition continued for about an hour, when she sank into a condition of profound coma, and gradually died.

Temperature, 98.4° on admission, rose to 100.4° before death.

CASE IV.—The symptoms were very well marked; there was no dread of fluids, but complete inability to swallow. The patient was at times very violent and delirious, requiring restraint. The case was treated with morphia and curare. Two grains and a half of the former were administered subcutaneously, without any apparent benefit. Two hours after admission, a quarter of a grain of curare was injected without any relief to the symptoms; and, three hours subsequently, after a repetition of the same dose, urgent symptoms of impending asphyxia suddenly appeared, the face becoming very livid. This condition, which was not preceded nor attended by any severe spasm of the larynx or muscles of respiration, came on suddenly, and without any warning, and was apparently due to the toxic action of the drug. Just as death appeared imminent, a severe attack of vomiting came on, which appeared to arouse the patient: for, in the course of a few minutes, the breathing improved, the pulse becoming stronger, and the face of a better colour; immediately afterwards, a severe attack of general spasms set in, and he became so violent that he had to be fastened down in bed. Three hours later, a quarter of a grain of curare was again injected; and, after a further interval of four hours, another one-third of a grain, without any apparent benefit or relief to the spasms, which were now so violent, that, in order to afford a temporary relief, chloroform was administered, and the patient kept under its influence for about twenty minutes. About an hour later, he fell into a condition of coma, and gradually sank.

Temperature, on admission 99.4°, rose before death to 101.4°.

CASE V.—In this case, the symptoms were of a very typical cha-

tacter, the dread of fluids being extreme. One-sixth of a grain of curare was injected shortly after admission, but without any relief to the spasms, respiration becoming more difficult, with a sense of intense suffocation, and the face of a dusky hue. The patient was then wrapped in blankets, and placed under a cage, with a large spirit-lamp burning beneath it. In less than a quarter of an hour, a marked change occurred; the spasms became less frequent and severe, entirely disappearing in the course of half an hour, the breathing, at the same time, becoming more regular and less rapid. This treatment was continued for an hour and a half, with great comfort to the patient, who lay quietly in bed, feeling perfectly easy, and expressing a desire to go to sleep, as well as her gratitude for the relief afforded. She dropped off into sleeps of from fifteen to twenty minutes' duration; but, suddenly awakening from a calm sleep that had lasted half an hour, she started up in bed, discharged saliva copiously from the mouth, and died very suddenly from spasm of the glottis, two hours after the hot-air bath had been discontinued.

Temperature, 98.8° on admission, was not marked, as in the other cases, by any rise before death.

CASE VI.—The symptoms in the little patient were very well marked, the spasms being excited on offering or even mentioning fluids, on blowing on the face, and also on pouring water from one vessel to another. Tracheotomy was performed by Mr. Lund; and the patient was kept under the influence of chloroform for an hour and a half after the termination of the operation; on its discontinuance, the spasms reappeared unrelieved. A hot-air bath was then employed, and its administration appeared to give considerable relief to the spasms, but not so marked as in the preceding case; for they still continued, though in a much milder form, the presence of the tube in the trachea appearing to keep them up by acting as a constant source of irritation. The hot-air bath was continued for three hours, and then stopped. After an interval of an hour and a half, during which the spasms were more frequent and severe, the bath was again employed; but the patient, falling into a condition of coma, gradually sank, and died in the course of about two hours.

The temperature was not taken.

CASE VII.—The spasms at the time of admission were so severe, and the sufferings of the little patient were so painful to witness, that, with a view of offering the readiest and most complete relief, chloroform was at once administered, and the patient was kept under its influence until death, which ensued in about five hours. There was a complete cessation of all spasm while under its influence; but, directly an attempt was made to discontinue it, they at once reappeared. The hot-air bath was also employed uninterruptedly, but without any apparent benefit.

Temperature 100.4° on admission; rose in the course of five hours to 104.0° before death.

REMARKS.—In the absence of any definite knowledge of the cause upon which this disease depends, we are led to treat its symptoms, the chief and most prominent of which are the spasms, always present to a greater or less degree at some stage in its course, and which indicate some irritation of the nervous centres.

From a comparison of the different plans of treatment adopted in the preceding cases, it will be seen that the methods employed may be

divided into four classes, a different result being aimed at in each instance, viz.:

1. Chloral and opium; administered as sedatives, in order to quiet the nervous excitement, and thus modify and allay the spasms by the direct action of these drugs on the nervous centres.

2. Chloroform and curare; given with the view of arresting the spasms by the special action of these agents on the muscles themselves, the one acting centrally, the other peripherally, on the nervous system.

3. Tracheotomy; performed in order to prevent death from asphyxia through spasm of the glottis.

4. The hot-air bath; employed with the view of eliminating the poison from the blood by means of the skin.

Of the four drugs made use of in these cases, chloral, by its sedative action on the nervous system, appears to give the most beneficial results, by prolonging life, and also by temporarily allaying the spasms, and in this way alleviating the sufferings of the patient. In the two cases in which it was employed, life was prolonged in the one instance for twenty-eight, in the other for fifty-one, hours after active treatment was commenced; in the remaining five cases, on the other hand (which came under treatment at much the same stage in the disease), and in which other plans of treatment were adopted, the patient did not, in any instance, survive for more than sixteen hours; so that, even though the action of chloral as a curative agent may be *nil*, yet, if it is a means of prolonging life even only for a few hours, valuable time is gained for the employment and trial of other remedies. Its administration by subcutaneous injection is a ready and effective method of giving the drug; much more so than by enema, as in the latter case there is the risk of causing an irritable condition of the rectum, and thus interfering with the employment of nutrient enemata, the only means of supporting the patient's strength. In neither case did the prick of the needle set up any spasm, nor was the injection followed by any evidence of local inflammation, though it is impossible to say whether abscesses might not have formed at the seat of injection if the patient had survived.

With respect to the action of morphia, though given in grain-doses frequently repeated, no such marked relief was observed as in the case of chloral; and I should be inclined to regard this drug as a remedy of much inferior value, both as a means of affording relief and of prolonging life.

With regard to the employment of curare, if it is to be administered until its toxic action is produced by causing general muscular paralysis, a new element of danger is introduced into the case; to ensure success, it is obvious that the general paralyzing action of the drug must be produced, a necessary result of which will be paralysis of the muscles of respiration tending to asphyxia, to say nothing of the risk of inducing sudden syncope from its more remote action on the heart. In the two cases in which it was employed (in the one instance after two injections of one-quarter grain each at an interval of three hours; in the other after a single injection of one-sixth of a grain), alarming symptoms of failure of the respiratory power suddenly appeared, while at the same time no relief was afforded to the spasms.

Chloroform as a curative agent is absolutely useless; but, as a means of producing a temporary and complete cessation of the convulsions, and as an auxiliary for introducing food into the stomach while the

patient is under its influence, it is not without value. During its administration, there is an entire freedom from all spasm; but, in the three cases in which it was employed, the convulsions returned on its discontinuance with all their former force. In Case VII, in which narcosis by this means was sustained uninterruptedly for four hours, I have no doubt that the fatal termination was hastened. The objection to its use, is the severe spasm which is excited on first attempting to bring the patient under its influence. In Case II, the convulsions were so violent, and such severe respiratory spasm was set up, that it was necessary to discontinue its use.

Tracheotomy has been advocated with the view of preventing death from sudden spasm of the glottis; but it will be found that, as a general rule, death does not take place from this cause, but rather from exhaustion and gradual failure of the heart's action, the patient sinking into a condition of complete coma, with abatement of all symptoms, respiration in many cases going on quietly and free from all spasm. In six of the preceding cases, this was the condition at the end; in one only, Case V, was death due to spasm of the glottis. In Case VI, in which tracheotomy was performed, the presence of the tube in the trachea appeared to be a constant source of irritation, apparently causing the patient considerable distress.

With regard to the hot-air bath, which has been much lauded by writers as a cure for hydrophobia, and especially by M. Bouisson, who states that he not only cured himself, but also eighty patients who had been bitten by rabid animals, we must remember that rabies only develops itself in a small proportion of those bitten by animals suffering from this disease. In Case III, in which this plan of treatment was adopted, and where the symptoms were very well developed, it very quickly afforded marked relief, all the spasms entirely ceasing, and the patient quietly dropping off to sleep. It did not, however, prevent a fatal issue; the patient dying, as has been described, from sudden spasm of the glottis, about two hours after it had been discontinued. Whether the result might have been different if it had been continued for a longer period, it is impossible to say; but I think that if any real benefit is to be derived from this plan of treatment, it should be employed at the very commencement of the disease, with the onset of the earliest premonitory symptoms. From Cases VI and VII, in which it was also used, no inference as to its curative value could be drawn: for, in the one, the patient was completely anæsthetised; in the other, tracheotomy had been performed, and the irritation of the tube seemed to favour the production of spasm.

Before concluding, I may briefly call attention to several other points of interest in connection with the foregoing cases: and first, with reference to the situation of the wound caused by the bite; in each instance, this was inflicted on the face, arm, or hand, showing that bites are much more disastrous when situated on parts of the body unprotected by clothing. In six of the seven cases, pain and irritation in the neighbourhood of the cicatrix accompanied the earliest premonitory symptoms. With respect to the temperature of the patient, it is stated by Bollinger, in the article on Rabies in Ziemssen's *Encyclopædia of Medicine*, that it is usually but slightly elevated: in three of the above cases, it rose to over 103° ; and the one in which it was the highest—viz., 105° —was that in which large quantities of chloral were administered; the physiological action of this drug, as observed in ex-

periments upon animals, being to cause a lowering of the body-heat. As regards the condition of the urine, it is stated, in the same article, that albumen is never present ; but in every one of these cases it was found in large amount before death ; in three instances, sugar was present in addition, evidently the result of some irritation of the medulla oblongata, the symptoms observed during life thus agreeing with the pathological changes observed after death, this being that portion of the nervous centres in which the most marked and constant lesions have been found.

Synopsis of Cases

No.	Name.	Physician or Surgeon.	Nature and Seat of Lesion.	Incubation Period.	Date of Admission.	Duration of Symptoms when admitted.	Time in Hospital.	Condition of Urine.	Temp. before Death.	Treatment.
I.	E. A. L.	Dr. Dreschfeld	Cat; hand	10 mos.	April 15, 1878	About 48 hours	28 hours	Albumen; no sugar	103.2°	Chloral.
II.	Frank A.	Mr. Bowring	Dog; hand	8 wks.	July 7, 1878	" 36 "	51 "	Albumen; sugar	105°	Chloral and morphia.
III.	Mary T.	Mr. Bradley	Dog; face	8 mos.	Oct. 31, 1878	" 48 "	16 "	Albumen; sugar	100.4°	Morphia.
IV.	William K.	Mr. Heath	Dog; hand	13 wks.	Dec. 7, 1878	" 24 "	15 "	Albumen; no sugar	101.4°	Morphia, curare, chloroform
V.	Susan T.	Mr. Bradley	Dog; hand	6 wks.	April 13, 1878	" 36 "	7 "	Albumen; sugar	98.8°	Curare, hot-air bath.
VI.	James C.	Mr. Lund	Dog; face	12 wks.	July 24, 1879	" 24 "	15 "	Albumen; no sugar	—	Tracheotomy, chloroform, hot-air bath.
VII.	Alfred R.	Mr. Bradley	Dog; face and arm	7 wks.	Nov. 19, 1879	" 36 "	5 "	Albumen; no sugar	104.6°	Chloroform, hot-air bath.

